Attorney's Docket No.: 07977/226002/US3548D1

REMARKS

Reconsideration and allowance of the above referenced application are respectfully requested. Claims 2-48 remain pending.

Claims 2-48 stand rejected under 35 USC 112, first paragraph, as allegedly not being fully supported by the originally filed specification. The rejection asserts that the specification is limited to crystallization of silicon with a catalyst material. However, this contention is respectfully traversed, and it is respectfully suggested that this interpretation is overly narrow, and that in fact the specification supports much more than this.

In fact, one of the patentable features of the claimed invention is that the semiconductor film with silicon over a substrate is irradiated using linear infrared light. The upper auxiliary linear infrared light and the upper main infrared light are located over the substrate. A lower auxiliary linear infrared light and a lower main linear infrared light are located under the substrate. Accordingly, it should be seen that this irradiation is a <u>different way of crystallization</u> then using a catalyst. Therefore, the present invention logically

clearly discloses that alternative technique of crystallization. See for example page 14 lines 4-6.

Multiple enumerated claims also stand rejected based on the allegation that the specification is limited to the formation of silicon. This has been obviated by amending the independent claims to recite that the semiconductor film includes silicon.

Claims 2-48 stand rejected under 35 USC 103a as allegedly being unpatentable over Nakajima in view of Hirano. The claims have been amended to emphasize their patentable distinctions, and as amended, it is respectfully suggested that all claims are patentable.

The disclosed invention recites fabricating a semiconductor device, with one of its features being irradiating the semiconductor film by scanning with at least a pair of auxiliary linear infrared light elements, and a pair of main linear infrared light elements in a predetermined direction. The light of both the main and auxiliary lights are located over the semiconductor film area the lower light of both the main and auxiliary infrared lights are located under the film. This is clearly shown in figures 6A and 6B and described in embodiment 2. In order to emphasize this feature, the claims have been amended.

between those references, do not teach or suggest that an upper auxiliary (first) linear infrared light, and an upper main (second) linear infrared light are located over the semiconductor; and that a lower auxiliary (first) linear infrared light and a lower main (second) linear infrared light are located at an underside of the semiconductor. The hypothetical combination does not teach in combination with the above that the intensities of the upper and lower main (second) linear infrared lights are larger than that of the upper and lower auxiliary (first) linear infrared lights. Finally, the references do not teach in combination with the above that the semiconductor film is irradiated using the auxiliary linear infrared light prior to the irradiation by the main linear infrared light as explained in the specification. Accordingly, even if these references could work combined in the way postulated by the rejection, it is respectfully suggested that the present claims still are not rendered unpatentable. Therefore, it is respectfully suggested that a proper prima facie showing of unpatentability against the claims can not be made.

In view of the above amendments and remarks, therefore, all of the claims should be in condition for allowance. A formal

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Respectfully submitted,

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Attached is a marked-up version of the changes being made by the current amendment.

Version with markings to show changes made

In the claims:

Please amend claims 2, 4, 8, 10, 14, 16, 20, 22, 25, 29, 30, 32, 36, 37, 41, and 42 as follows:

2. (Amended) A method for manufacturing a semiconductor device comprising steps of:

forming a semiconductor film comprising silicon over a substrate; and

irradiating said semiconductor film by scanning with at least [two] first and second pairs of linear infrared lights in a predetermined direction, intensities of the second pair of linear infrared lights are larger than that of the first pair of linear infrared lights,

wherein [at least two] upper lights of the first and second pairs of said linear infrared lights are located over said substrate and [the other at least two] lower lights of the first and second pairs of said linear infrared lights are located at a backside of said substrate.

4. (Amended) A method according to claim 2, wherein said

8. (Amended) A method for manufacturing semiconductor device comprising the steps of:

forming a semiconductor film over a substrate; and

irradiating said semiconductor film comprising silicon by scanning with at least two [pairs of] two main linear infrared lights and two auxiliary linear infrared lights in a predetermined direction so as to form and move a temperature gradient in the semiconductor film,

wherein an upper light of the auxiliary linear infrared lights and an upper light of the main linear infrared lights are located over said semiconductor film and a lower light of the auxiliary linear infrared lights and a lower light of the main linear infrared lights are located at an underside of said semiconductor film.

10. (Amended) A method according to claim 8, wherein said semiconductor film comprises [silicon or] silicon compound represented by Si_xGe_{1-x}.

14. (Amended) A method for manufacturing a semiconductor device comprising steps of:

forming a semiconductor film comprising silicon over a

irradiating said semiconductor film with at least [two pairs] a pair of main linear infrared lights and a pair of auxiliary linear infrared lights while moving said substrate in a direction perpendicular to the linear infrared lights,

wherein [a first] an upper light of the auxiliary linear infrared lights and [one of] an upper light of the main linear infrared lights is located over said substrate and a [second] lower light of the auxiliary linear infrared lights and [the other one of said] a lower light of the main linear infrared lights is located at a backside of said substrate, and

wherein said semiconductor film is irradiated with said [first and second] auxiliary lights prior to said main linear infrared lights.

16. (Amended) A method according to claim 14 wherein said semiconductor film comprises [silicon or] silicon compound represented by Si_xGe_{1-x}.

20. (Amended) A method for manufacturing semiconductor device comprising the steps of:

forming an amorphous semiconductor film comprising silicon over a substrate; and

crystallizing the semiconductor film by scanning with at

infrared lights and first and second lower linear infrared lights in a predetermined direction, intensities of the second upper and lower linear infrared lights are larger than that of the first upper and lower linear infrared lights,

wherein said [at least two] first and second upper linear infrared lights are located over said substrate and said [at least two] first and second lower linear infrared lights are located at a backside of said substrate, and

wherein said predetermined direction is coincident with a direction of crystal growth in the semiconductor film.

22. (Amended) A method according to claim 20, wherein [at least one of pairs of said] the first upper linear infrared lights and the first lower linear infrared lights [is] are auxiliary lights, respectively.

25. (Amended) A method according to claim 20, wherein semiconductor film comprises [silicon or] silicon compound represented by Si_xGe_{1-x}.

29. (Amended) A method for manufacturing semiconductor device comprising the steps of:

forming an amorphous semiconductor film comprising silicon

crystallizing the semiconductor film by scanning the semiconductor film with at least [two pairs] a pair of first upper and first lower linear infrared lights and a pair of second upper and second lower linear infrared lights in a direction in order to form and move a temperature gradient the semiconductor film,

wherein said [at least two] upper linear infrared light are located over said semiconductor film and said at least two lower linear infrared light are located at an underside of said semiconductor film, and

wherein said direction is coincident with a direction of crystal growth to be proceeded in the semiconductor film.

30. (Amended) A method according to claim 29, wherein [the scanning direction coincide with the direction of crystal growth in the semiconductor film] intensities of the first upper and first lower linear infrared lights are smaller than that of second upper and second lower linear infrared lights.

32. (Amended) A method according to claim 29, wherein the semiconductor film comprises [silicon or] silicon compound represented by Si_xGe_{1-x}.

36. (Amended) A method for manufacturing a semiconductor device comprising steps of:

forming an amorphous semiconductor film comprising silicon over a substrate; and

crystallizing said semiconductor film by irradiating said semiconductor film with at least [two pairs of] a pair of main linear infrared lights and a pair of auxiliary linear infrared lights while moving said substrate in a perpendicular to the linear infrared lights,

wherein [at least two] one of said main linear infrared lights and one of the auxiliary linear infrared lights are located over said substrate and the other [at least two] one of said main linear infrared lights and the other one of the auxiliary linear infrared lights are located at a backside of said substrate, and

wherein an irradiating direction is coincident with a direction of crystal growth to be proceeded in the semiconductor film.

37. (Amended) A method according to claim 36, wherein said semiconductor film comprises [silicon or] silicon compound represented by Si_xGe_{1-x}.

41. (Amended) A method for manufacturing a semiconductor device comprising steps of:

forming an amorphous semiconductor film comprising silicon over a substrate; and

crystallizing said semiconductor film by scanning with [a plurality] first and second pairs of linear infrared lights in a direction perpendicular to a longitudinal direction of the linear infrared lights, each of said first and second pairs of linear infrared lights consisting of an upper [linear infrared] light and a lower [linear infrared] light,

wherein [each] upper lights of the first and second pairs of linear infrared lights [is] are located over said substrate and [each] lower lights of the first and second pairs of linear infrared lights [is] are located at a backside of said substrate, and

wherein [a scanning direction is coincident with a direction of crystal growth to be proceeded in the semiconductor film] said semiconductor film is irradiated with the first upper and lower lights prior to second upper and lower linear infrared lights.

42. (Amended) A method according to claim 41, wherein said semiconductor film comprises [silicon or] silicon compound represented by Si_xGe_{1-x}.